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VOL. I.

COLUMBUS, OHIO, MARCH, 1917

No. 3

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Epsilon Chapter.

On March 5, 1917, Epsilon Chapter of Phi Sigma was installed at the University of Denver by Prof. Ira E. Cutler, head of the Department of Biology, who was specially delegated to perform that duty. The new Chapter already has seven new members pledged who will be initiated in the near future. Epsilon Chapter has adopted the policy of conducting an examination of initiates on the history and aims of the organization and it is the intention that each initiate shall prepare a short paper on some biological subject which shall be a part of a regular program.

The secretary of Epsilon Chapter is E. H. Stewart, 2174 South Columbine St., Denver, Colorado.

Early History of the Germ Cells.

Emory W. Sink, Beta.

The following is an abstract of an earlier report issued several years ago (1912) in the Michigan Academy of Science. Although this work has not been carried on to completion, the author believes that a restatement of the problem may stimulate others to carry on similar investigations.

Whether the germplasm is handed down from one generation to another in an unbroken chain, or ever arises *de novo* from somatic cells is a question fundamental in biological research.

Various views have been advanced regarding the origin of the germ cells in Vertebrates, and possibly all of them are true to a certain degree. The facts in the problem remain,

however, that in Vertebrate development, the germ cells are located in regions other than their definitive positions, and later by a rearrangement or active migration come to life in the sex gland ridges. The questions, just where these cells originate, in just what regions of the embryo they are found during early development, and just why and how they finally get to the sex gland ridges are usually answered by inference and not by conclusive scientific evidence. Much difficulty is encountered in the problem, since in the early stages, the germ cells resemble very closely the somatic cells, and hence are not easily recognized from the latter. Segregation of the germ cells at a very early stage in development seems to be the key note. However we are not justified in concluding that they originate in the place where we happen to observe them for the first time and can unhesitatingly call them the primordial germ cells. It is possible and quite probable that their true origin could, under more favorable technique and especially in a suitable species, be traced still further.

The toadfish (*Opsanus tau*) seems to be a favorable species, as its primordial germ cells are large and quite easily recognized, especially in the later stages. The method of procedure was to study serial sections of such an embryo in which the germ cells could be easily recognized within the sex gland rudiments. By studying successively younger stages, the positions of the germ cells were determined and by inference these positions are believed to indicate the migratory path during early development. In case of the toadfish, this path seems to begin from the entodermal layer of the alimentary canal, where they were first observed, then proceeds dorsally through the gut mesentery and finally laterally on either side to the sex gland ridges which later become incorporated into the sex glands themselves.

The figures are microphotographs of sections, showing the germ cells along the path as outlined above.

Explanation of Figures.

Abbreviations used.

- a—Nerve cord.
- b—Notochord.
- c—Wolfian duct.
- d—Sex gland.
- e—Alimentary canal.
- f—Germ cell.
- g—Body cavity.
- h—Aorta.
- i—Opening due to shrinkage.
- j—Ectoderm.
- k—Mesoderm.
- l—Entoderm.
- m—Periblast layer.
- n—Periblast nuclei.
- o—Yolk granule.

Figure 1.—Portion of a cross section of embryo 105Ab through the glands (d). Length of embryo 8.6mm.

Figure 2. Portion of Fig. 1 more highly enlarged, showing a germ cell (f) in the sex gland.

Figure 3. Portion of a longitudinal section of embryo 93Aa through the sex gland (d), showing several germ cells (f). Length of embryo 5.75mm.

Figure 4. A similar longitudinal section also showing germ cells in the sex glands.

Figure 5. Portion of a cross section of embryo 105Ac through the sex gland, showing a germ cell at the neck of the gland.

Figure 6.—Portion of a cross section of embryo 90Aa, showing a germ cell (f) in the germinal ridge just ventral to the Wolfian duct (c). Length of embryo 4.75mm.

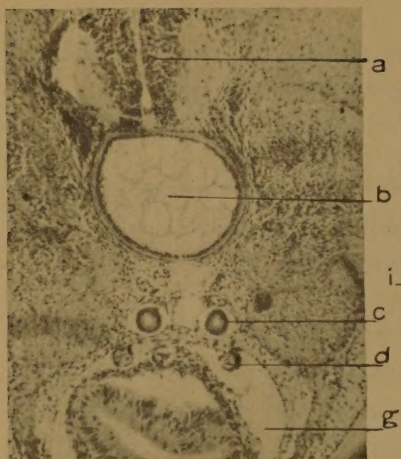
Figure 7. Portion of a cross section of embryo 90Aa, showing germ cells (f) in the germinal ridge and also in the mesentery supporting the alimentary canal (e).

Figure 8. Portion of a cross section of embryo 84Ba, showing a germ cell (f) in the mesothelium just dorsal and to the left of the gut entoderm. Length of embryo 3.5mm.

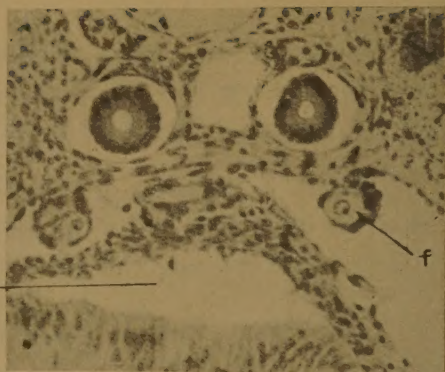
Figure 9. Portion of the same embryo showing a germ cell (f) within the gut entoderm.

Figure 10. Portion of a cross section of the same embryo through the region of the hind gut, showing three germ cells (f) in the gut entoderm, two of which are undergoing mitotic division and the other possessing a peculiar bilobed nucleus.

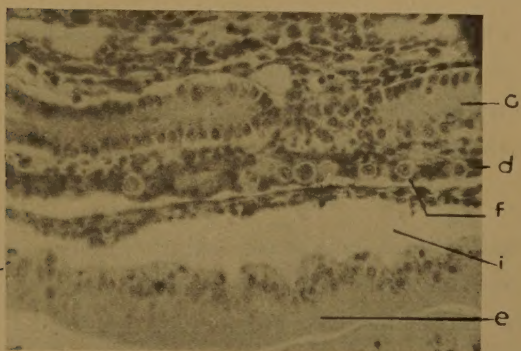
Figures 11 and 12 are shown as representing earlier stages. No germ cells are indicated, but the sections are interesting because of the large periblast nuclei (n) whose origin and fate are in some doubt. They are believed to arise from the marginal cells of the germ disc during very early development. Their function is probably a physiological one, preparing the yolk for absorption. In several instances, a yolk granule (o) occurs near such a periblast nucleus (Figure 12).



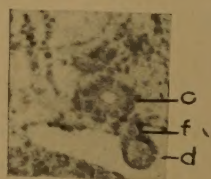
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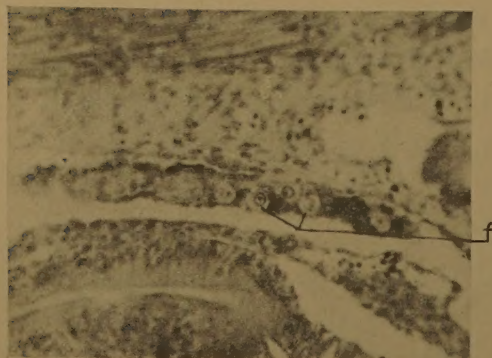
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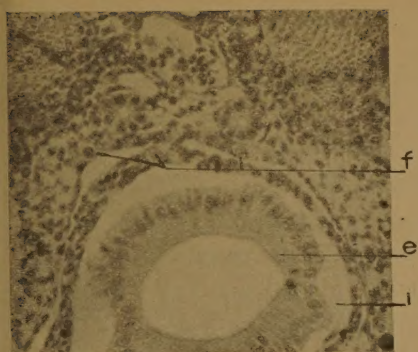
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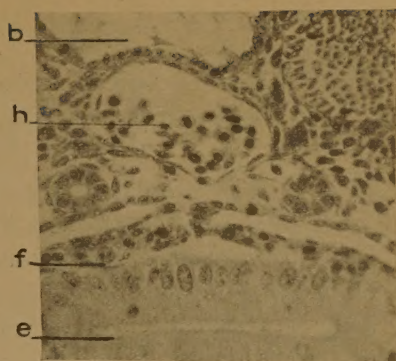
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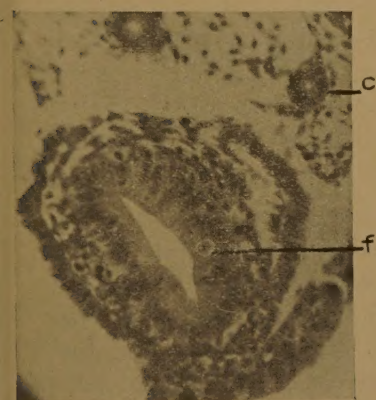
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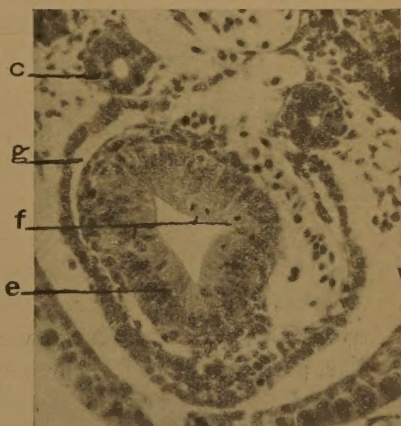
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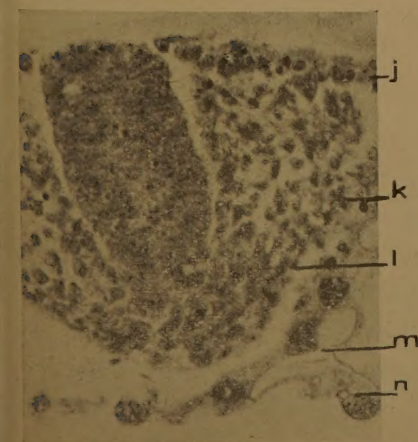
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Work in Progress at the Ohio Experiment Station.

D. C. Mote, Alpha.

As it is only thru the Biologist that many of us learn of the achievements of our Brother Phi Sigmas, it is fit and proper that there should appear in each number a few sketches of what is being done in the varied fields of biological research chosen or thrust upon the members. Since our organization is still in its infancy these stories will be, in many instances, reports of progress or undertakings rather than of completed work.

The writer has been connected with the department of Animal Husbandry of the Ohio Experiment Station since the summer of 1912 organizing and prosecuting work on the parasites of domestic animals. These few years have demonstrated clearly and keenly that progress in research is tediously slow.

We have under way three main projects and several minor ones. Just at present the Ox Warble-fly is taking up the major portion of the day's work. In a study of the distribution of these flies it was found that both, the so-called European warble fly, *Hypoderma bovis*, and *H. lineata* occurred within the confines of the state, and that contrary to expectation, *Hypoderma bovis* was the most abundant. An article on the distribution of these flies will appear in one of the journals in the near future. It is hoped that sufficient material can be brought together to pass muster for a Ph.D. next June.

In season the Gape worm of chickens is studied. Last spring and early summer outbreaks of gapeworm disease were very numerous due no doubt to the wet spring. Experiments indicate that chicks become infested by ingesting food contaminated with the embryo gapeworms.

The Thornheaded worm of hogs has received some consideration. We are fortunate in discovering an initial infestation in a litter of pigs, and were thus enabled to collect data

on the rate growth of the worm in the intestine. Experimental infestation of white grubs (*Locnosteria* sp.) with the embryo the worms has so far not been successful.

An investigation of the life history, habits, mode of infestation prophylaxis and treatment of these three parasites constitute the main problems at present under consideration.

Among the minor projects may be mentioned an investigation of the methods of combating external parasites; the testing of the efficacy of anthelmintics for expelling worms from the intestinal tract; the effect of the rotation of pasture upon the parasites inhabiting the intestinal tract of sheep.

Answering correspondence relative to animal parasites is one of the routine duties of the office. Frequently parasites are received with a query as to their nature. These are identified and placed in the station collection, which, to date, consists of several thousand specimens. It is our desire to make this a representative collection of well preserved parasites of other animals, as well as domestic animals. In such a collection will be found plenty of good material for morphological and taxonomic studies as well as revealing points in the habits and life history of the parasites. Brother Phi Sigmas can aid us materially in making such a collection by remembering that we shall always be glad to receive specimens of animal parasites from all parts of the country, no limitation being placed upon the host animal.

Abstracts.

The Relation of the Profundus and Gasserian Ganglia of the Embryo of The Urodele, *Plethodon Glutinosus*.

Katherine W. Okey, Alpha, Oxford, Ohio.

(Department of Anatomy, The Ohio State University)

(32 figures and 2 tables.)

The O. Jour. of Sci., Vol. XVII, No. 2, 1916, pp. 25-51.

This paper presents an analysis of a series of embryos of *Plethodon*, consisting of 38 stages taken at average intervals

of 4 hours, and ranging in length from 6mm. to 11.5mm, in an effort to trace the profundus and Gasserian ganglia from the condition appearing in the 11.5mm embryo to the earlier stages where the ganglia are separate and to describe their exact relation at critical stages. No final conclusions are drawn as to the phylogenetic relations of these two ganglia.

There are included, detailed descriptions of the microscopic findings in the various stages and a complete summary follows with the conclusion "that for this form, the ganglia of the adult are formed by an actual fusion of the profundus with the Gasserian without loss of cells by the profundus portion. This would not warrant the conclusion that the same process occurs in types where there is a loss of the ramus ophthalmicus profundus nerve, but it throws an interesting light on the mode by which the process of reduction ending in the loss of both profundus ganglion and nerve began in phylogeny.

Alpha Chapter.

On the evening of Feb. 7, 1917, Alpha chapter held its regular midyear initiation. After a short introductory address on the aim of Phi Sigma, President Van Buskirk proceeded with the initiatory ceremony. The following is the personnel of the new members: Forest W. Dean, a graduate student, Ass't in Botany. His investigation embraces Physiographic Ecology, Forest Entomology and Wood Anatomy. Walter W. Randolph, an Arts student, doing special work in chemical bacteriology; his investigation is, the phagocytosis in natural immune animals. Jasper D. Sayre, an Arts student, doing additional work in botany, an assistant in botany giving plant physiology; his investigation is transportation (Plant Physiology). Wm. P. Smith, a medical student, instructor in anatomy; his investigation is that of Vasculogenesis. After the initiation Mr. Waller, of the Social Committee, served a light lunch.

Alpha Chapter at present has an active membership of twenty-two. They are distributed as to colleges and depart-

ments as follows: Colleges, Graduate School, 9; Medical, 5; Arts, 4; Agriculture, 1; Vet. Medicine, 1; Alumni Members, 2. Departments—Bacteriology, 5; Botany, 4; Anatomy, 3; Physiology, 3; Entomology-Zoology, 3; Pathology, 2; Public Health, 2.

On February 28th, Prof. Edgar N. Transeau, of the Department of Botany, addressed Alpha Chapter on the subject of "Pragmatic Botany."

The Chapter is planning to celebrate March 17th, as Founder's Day, with a special program and a supper. The members of the committee are keeping quiet as to the nature of the latter but promise that it will be something worth while.

Beta Chapter.

E. W. Sink.

Beta Chapter, although suffering a loss of members during the first semester, has been very fortunate in adding to its membership recently several new men, who are mostly upper-classmen. The influence of these men has been of great value in creating a better grade of research spirit. The chapter now lists 19 active members and 8 inactives and alumni members. For the second semester, a program has been arranged whereby all the active members will take part. Groups of five or six members with a leader have been selected and one group will provide the program for a meeting. In addition, three faculty lectures are planned. These are not open lectures, but each member is privileged to bring one visitor. The last meeting of the year has been left open for the "Field Day" which has been the custom of the original Club.

Beta Chapter was very fortunate in securing for one of its meetings (Feb. 15th) Prof. E. C. Case, who gave a most interesting talk on the Relation of Paleontology to Biology. Light refreshments were served and a general informal discussion took place.

Delta Chapter.

Maurice Jacobs, University of Maine, Orono, Me.

Phi Sigma is now established at the University of Maine as a live factor in university affairs. We have started off with a rush, and are planning to put the local chapter on the map as the best honorary society at Maine. Every member is actively engaged in some research work along biological lines.

Delta chapter has as a nucleus a very good set of men and women on whom to build a strong permanent organization. Our chapter consists of the following:

Minton Asbury Chrysler, B. A. (Toronto), Ph.D. (Chicago). Dr. Chrysler is Professor of Biology at the University and has published many articles in scientific papers, among them the following:

Anatomical Notes on Certain Strand Plants; Bot. Gaz., 37, 1904.

The Development of the Central Cylinder of Araceae and Liliaceae; Bot. Gaz., 38, 1904.

Regeneration in *Zamia* (with J. M. Coulter); Bot. Gaz., 38, 1904.

Reforestation at Woods Hole, Mass.—A Study in Succession; *Rhodora* VII, 79, 1905.

The Nodes of Grasses; Bot. Gaz., 41, 1906.

On Cretaceous *Pityoxla* (with E. C. Jeffrey); bot. Gaz. 42, 1906.

The Lignites of Brandon (with E. C. Jeffrey); Fifth Rep. Vermont State Geologist, 1906.

The Microgametophyte of the Podocarpaceae (with E. C. Jeffrey); Am. Nat. XLI, 486; 1907.

The Structure and Relationships of the Potamogetonaceae and Allied Families; Bot. Gaz., 44; 1907.

Tyloses in Tracheids of Conifers; *The New Phytologist*, III, 8; 1908.

The Fertile Spike in Ophioglossaceae; *Annals of Bot.*; XXIV, 43; 1910.

The Ecological Geography of Maryland; Coastal Zone, Western Shore District; Vol. III, Maryland Weather Service.

Is *Ophioglossum palmatum* anomalous? *Bot. Gaz.*, 52; 1911.

Recent Work on Evolution in the Dicotyledons; *Plant World*, XVI, 6; 1913.

The Origin of the Erect Cells in the Phloem of the Abietineae; *Bot. Gaz.*, LVI, 1, 1913.

Symposium on the Scope of Biological Teaching in Relation to New Fields of Discovery from the Standpoint of a Botanist; *Science*, N. S. XXXIX, 1002; 1914.

The Medullary Rays of *Cedrus*; *Bot. Gaz.* LIX, 5; 1915.

Alice Middleton Boring, A.B., A.M., Ph.D. (Bryn Mawr) is associate professor of Zoology. Dr. Boring has published the following articles:

Relation of the First Plane of Cleavage and Grey Crescent to the Median Plane of Embryo of the Frog (with T. H. Morgan). *Arch. f. Entw. Org.* 17; 1903.

Closure of Longitudinally Split Tubularian Stems. *Biol. Bull.* 7; 1904.

Regeneration in *Polychoerus Caudatus* (with N. M. Stevens). *Jour. Exp. Zool.* 2; 1905.

Planaria morgani n.sp. (with N. M. Stevens). *Proc. Acad. Nat. Sci., Philadelphia*, Feb., 1906.

Study of Spermatogenesis of 22 species of Membracidae, etc. *Jour. Exp. Zool.* 4; 1907.

A small chromosome in *Ascaris megalocephala*. *Arch. f. zellforschung*, 4; 1909.

On the effect of different temperatures on size of nuclei in the embryo of *Ascaris megalocephala*. Arch. f. Entw. Org. 28; 1910.

The interstitial cells and the supposed internal secretion of the chicken testis. Biol. Bull. 23; 1912.

Fat deposition in the testis of the domestic fowl (with Raymond Pearl). Science, N.S. 36; 1912.

The odd chromosome in *Cerastipsocus venosus*. Biol. Bull. 24; 1913.

The chromosomes of the Cercopidae. Biol. Bull. 24; 1913.

The odd chromosome in the spermatogenesis of the domestic chicken (with Raymond Pearl). Jour. Exp. Zool. 16; 1914.

Some physiological observations regarding plumage patterns (with Raymond Pearl). Science, N.S. 39; 1914.

Further notes on the chromosomes of the Cercopidae (with R. H. Fogler). Biol. Bull. 29; 1915.

Wallace Craig, B.S., M.S. (Illinois); Ph.D. (Chicago), was recently elected to membership in Phi Sigma. Dr. Craig is professor of Philosophy and Psychology. He has written the following articles;

Literary Notices. Jour. Comp. Neur. and Psych.

Songs in Birds. Science, N.S. XV; 1902.

North Dakota Life; Plant Animal and Human. Bull. Am. Geog. Soc.; 1908.

The Voices of Pigeons Regarded as a Means of Social Control. Am. Jour. Soc.; 1908.

The Expression of Emotions in the Pigeons: The Ring Dove. Jour. Comp. Neur. and Psych. XIX; 1909.

Oviposition Induced by the Male in Pigeons. Jour. Morph. XXII; 1911.

Expressions of Emotions in Pigeons: II, Mourning D. and III Passenger Pigeon. The Auk; 1911.

Observations on Doves Learning to Drink. Jour. Animal. Beh., II; 1912.

Behavior of the Young Bird in Breaking out of the Egg. Jour. Ani. Behav. II; 1912.

The Stimulation and Inhibition of Ovulation in Birds and Mammals. Jour. Ani. Behav. III; 1913.

Peter, My Painted Bunting. Ovicult Mag. IV; 1913.

Method of Recording Bird Music With a Correction. Auk, XXX; 1913.

Male Doves Reared in Isolation. Jour. Ani. Behav. IV; 1914.

Synchronism in the Rhythmic Activities of Animals. Science, N.S. 44; 1916.

Pigeons Do Not Carry Their Eggs. Auk, N.S. 29; 1912.

Recollections of the Passenger Pigeon in Captivity. Bird Lore XV; 1913.

Attitudes of Appetition and of Aversion in Doves. Jour. Phil. Sci. and S. M. XI; 1914.

Two Partial Albino Birds. Science, N. S. 42; 1915.

Harry Newton Conser, B.S. (Central Penn. College), M.S. (Central Penn. College), A.M. (Harvard) is assistant professor of botany. He has published many articles on botanical lines in scientific papers.

Glen Blaine Ramsey, A.B., A.M. (Indiana), is assistant plant pathologist in the Agricultural Experiment Station. He has published the following:

The genus *Rosellinia* in Indiana. Proc. Ind. Acad. Sci.

A form of potato disease produced by *Rhizoctoni*. (In printers hands).

Abraham Strauss, B.Sc. (Mass. Agri. College), is instructor in Botany.

Donald Vince Atwater, B.S. (Maine), is assistant in Biology. He is working under Dr. Raymond Pearl for his master's degree. His thesis is "The effect of chronic alcoholism of the parents on the progeny."

The student members of the local chapter are: Thomas Everett Fairchild, B.S., Elizabeth Mason Bright, Parkman Abbott Collins, Robert Kemble Fletcher, Maurice Jacobs, Parker Nash Moulton, Henry Andrew Peterson, Donald Stuart Welch, Grace Mabel Gibbs, Doris Ethel Russel.

The following officers were elected at a recent meeting: President, Henry Andrew Peterson; Vice President, Donald Stuart Welch; Secretary, Elizabeth Mason Bright; Treasurer, Robert Kemble Fletcher; Historian, Grace Mabel Gibbs; Sergeant at Arms, Parkman Abbott Collins; Biologist Correspondent, Maurice Jacobs.

The department of Biology recently inaugurated "Biology Day." It was a splendid success. The receipts of the day is to go for a scholarship at the Martine Biological Laboratory, Woods Hole, Mass.

Phi Sigma was recently honored by the election of two of its members to the honorary scholastic society, Phi Kappa Phi. Our two fortunates are the Misses Bright and Gibbs.

It is with a great deal of regret that we inform the chapters that Mr. P. B. Wiltbereger is to leave us at the end of the month. The "Father of our chapter" is leaving for the Michigan Exp. Station, where he has received a splendid appointment as Entomologist.

Personals.

Alpha.

Willis C. Lane, B.Sc. '15, died at his home in Springfield, Ohio, on January 12th, of gangrene poisoning. He had been ill for some time, having been obliged to give up his position

of instructor in Biology at the University of Maine late last year. He became a member of Phi Sigma in the spring of 1915 and was also elected to Sigma Xi about the same time.

In 1912 he attained to the degree of Ceres in the Order of the Patrons of Husbandry in the National Grange. Mr. Lane was a very thorough student and gave great promise as a scientific worker. It is with great regret that we learn of his untimely death.

J. I. Hambleton, senior student in Agriculture and specializing in Entomology has withdrawn from school this semester to take up work in the department of Entomology of the University of Wisconsin, where he will have an assistantship and at the same time do work toward a graduate degree.

C. A. Reese, B.Sc. '15, has resigned from his position in the department of Entomology in Iowa State Agricultural College at Ames, to take up work of a similar nature in West Virginia University at Morgantown, W. Va.

Errol L. Fox has returned to school this semester to complete the work necessary for his degree of Bachelor of Arts.

P. B. Wiltberger, B.Sc. in Entomology '16, M.Sc., has resigned from his position in the department of Biology of the University of Maine to take up work at the Michigan Agricultural Experiment Station at Lansing, Mich. He will fill the position of research entomologist.

Beta.

Theodore L. Squier is an assistant in Clinical Microscopy and is also taking Sophomore work in the School of Medicine.

Lynne A. Hoag, B.S. is an assistant in Anatomy, is taking Junior work in the School of Medicine, and is also registered in the Graduate School for the M.S. degree.

Paul H. Piper, B.S. is an assistant in Physiological Chemistry and is doing Junior work in the School of Medicine and in addition is enrolled in the Graduate School for the M.S. degree.

J. S. Rogers, M. A. is an assistant in Zoology and is doing special work in the field of Fresh Water Ecology.

Ernest Reed is an assistant in Botany and is doing special work in Plant Regeneration.

Howard Liddell is carrying on special work in the Department of Psychology, and is especially interested in the "Involuntary Movements of the Eye in Attention."

Max Wershow, D.V.M., formerly of Alpha chapter, has become affiliated with Beta chapter. He is carrying Freshman work in the School of Medicine.

Carl P. Russell, A.B. has just recently accepted a position at The College of St. Thomas, St. Paul, Minn.

R. H. Dott, is an assistant in Mineralogy.

Owing to an oversight on the part of the Editor the names of R. H. Dott and W. F. Kroener were omitted from the list of charter members of Beta Chapter in the last issue of The Biologist.

Extension Progress.

Delta Chapter was installed by Mr. Wiltberger on the evening of January 27th. The installation was conducted at a winter resort about twenty miles from Orono and was made the occasion of a great deal of fun on the part of the members along with the more serious part of the ceremonies.

The petition from Pi Beta Omega of the University of Denver has been accepted and this organization will be installed as Epsilon Chapter of Phi Sigma in the near future. We shall be especially pleased to welcome this organization as one of our number for, like Beta Chapter it has been organized and doing good work for several years and should add much to the strength of the national organization.

Mr. Cummins reports that there is no prospect of the formation of a Chapter at Vanderbilt University. Mr. Reese also reports unfavorably on the possibilities of a Chapter at Ames. He and Mr. Reinhardt made several efforts to get a group under way but Mr. Reese now reports that they were unable to do anything there as he does not believe there is a group there worthy of membership in our organization.

A society has been organized at the University of Wisconsin and the secretary has written for information, making the statement that they expect to send in a petition in the near future. With the help of Mr. Hambleton they should be able to complete all arrangements before long.

There is also a biological club at the University of Kentucky, which has been in communication with the President for some time past and we may expect them to petition before the close of the school year.

There has been no report of any further progress from Bowdoin, Cornell, or Illinois. But we have no reason for discouragement for it will take some time for people to become acquainted with the aims and purposes of the organization and to come to a realization of the worth of such a society. It is well enough that local organizations in these various schools are moving slowly and cautiously for we do not care to accept any hastily formed organizations that cannot be well enough grounded to insure to themselves and to us that they can keep alive after the first spurt of activity. Our experience with Gamma Chapter will be a valuable lesson to us in that respect. It is to be feared that we will yet lose this Chapter tho the President is doing everything possible to stave off such a loss.

Notice.

Owing to the difficulty of carrying on the administration of the society under the present Constitution it has been decided that there should be a revision of the same without waiting for a convention next year. Therefore, Beta Chapter has been constituted as a committee to take care of this. Their work will be submitted for a referendum vote to the other Chapters. Anyone having suggestions as to changes may send them to the Chapter secretary of Beta. It should be borne in mind that the committee is in no way obligated to act on any suggestion if it does not seem wise that it should do so.

